



Overview

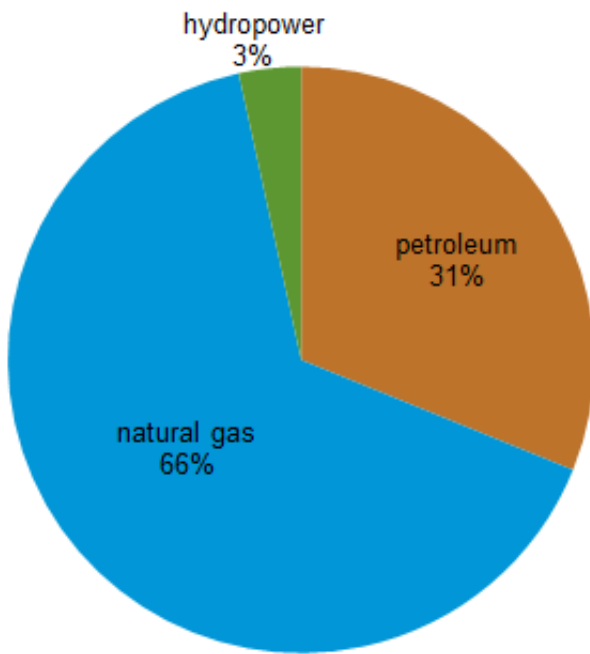
Azerbaijan, wholly located within the [South Caspian Sea](#) basin, is among the oldest oil producers in the world. Oil and gas development and export is central to Azerbaijan's economic growth. The country is one of Caspian region's most important strategic export openings to the West.

Azerbaijan, one of the oldest oil producing countries in the world, is an important oil and natural gas supplier, particularly for European markets. Although traditionally it has been a prolific oil producer, Azerbaijan's importance as a natural gas supplier will grow in the future as field development and export infrastructure expands. The [conflicting claims](#) over the maritime and seabed boundaries of the Caspian Sea between Azerbaijan and Iran continue to cause uncertainty, with Iran challenging Azerbaijan's hydrocarbon exploration in its offshore area.

Natural gas accounted for about 66 percent of Azerbaijan's total domestic energy consumption in 2010, with oil consumption at 31 percent of total energy use, and a marginal contribution from hydropower. Overall, Azerbaijan is a net energy exporter. The country swaps small volumes of natural gas with Iran-the Nakhchivan enclave receives all of its natural gas from Iran, because it is not connected to Azerbaijan's pipeline network.

Oil and gas development and exports are central to Azerbaijan's economy. The country's economy is heavily dependent on its energy exports, with more than 90 percent of total exports accounted for by oil and gas exports, according to the International Monetary Fund data.

Azerbaijan's primary energy consumption, 2011



Source: U.S. Energy Information Administration, International Energy Statistics Database



Source: CIA Factbook

Oil

Unexpected production problems at its largest fields caused total output to fall to below 1.0

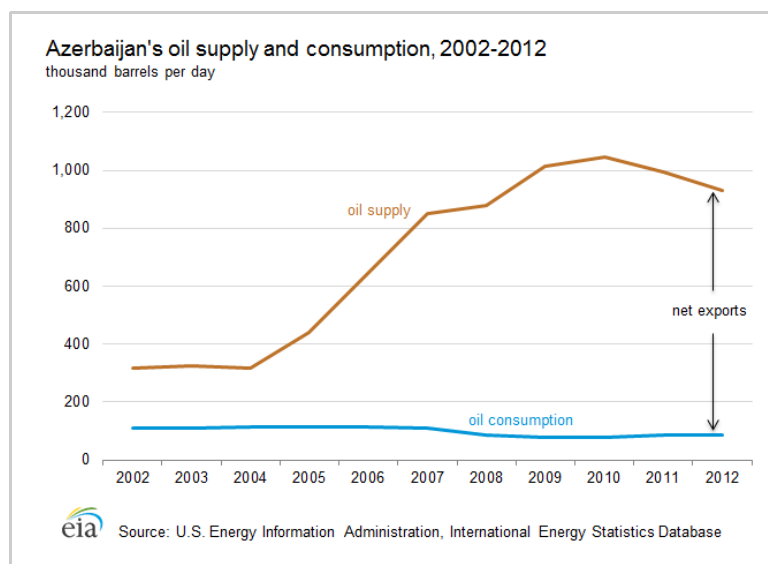
million bbl/d in 2011, and total production continued to decline through the middle of 2013.

Azerbaijan's proven crude oil reserves were estimated at 7 billion barrels in January 2013, according to the *Oil and Gas Journal* (OGJ). In 2012, Azerbaijan produced approximately 930,000 barrels per day (bbl/d) of total oil and consumed about 85,000 bbl/d. The country was among the 20 largest exporters of oil in the world in 2012.

Azerbaijan is one of the world's oldest producing countries and has played a significant role in the development of today's oil industry. The world's first paraffin factory was opened there in 1823 and the first oil field was drilled in 1846. Azerbaijan was the site of the first offshore oil field, the Neft Dashlary, in the shallow water of the Caspian Sea, which still produces oil today.

The country's largest hydrocarbon basins are located offshore in the Caspian Sea, particularly the Azeri Chirag Guneshli (ACG) field, which accounted for more than 80 percent of Azerbaijan's total oil output in 2012. Similar to its share of total production, ACG also holds the vast majority of Azerbaijan's total reserves, with approximately 5 billion barrels located in this field.

Although Azerbaijan is a net exporter of crude oil, the country imports some crude oil from Turkmenistan and Kazakhstan. The country imports some oil because of the divergence between the high price for crude oil on the world market and the regulated low price for oil on the domestic market, which has made it unprofitable for oil producers to supply domestic refineries. While the bulk of oil imported from Kazakhstan and Turkmenistan is trans-shipped via the Baku-Novorossiysk pipeline, some of the volume is processed at State Oil Company of Azerbaijan Republic (SOCAR) refineries to supply oil products to the domestic market.



Sector organization

Although the State Oil Company of Azerbaijan Republic (SOCAR) is involved in all segments of the oil sector, it produces only about 20 percent of Azerbaijan's total oil output, with the remainder produced by international oil companies.

Almost immediately following its independence, Azerbaijan allowed foreign participation in

its oil sector, and it has signed the most production-sharing agreements among all former Soviet Union countries. In general, hydrocarbons are produced under production-sharing agreements, with the share of profits dependent on the internal rate of return achieved by the project.

SOCAR, which produces approximately 20 percent of the country's output, is responsible for exploration and production of oil and natural gas in Azerbaijan, operating the country's two refineries, running the country's pipeline system, and managing the country's oil and natural gas imports and exports. Although the Ministry of Industry and Energy handles exports as well as exploration and production agreements with foreign companies, SOCAR participates in all of the international consortia developing oil and gas projects in Azerbaijan. On its own, SOCAR produces less than 20 percent of Azerbaijan's total output, with the remaining 80 percent being produced at the ACG oil fields by the BP-operated Azerbaijan International Operating Company (AIOC) and at the BP-operated Shah Deniz field (oil condensate). AIOC is a consortium of nine petroleum companies that have signed extraction contracts with Azerbaijan. The AIOC is led by BP and includes Chevron, Inpex, Statoil, Turkiye Petrolleri, ExxonMobil, SOCAR, ITOCHU, and Hess. BP and a number of other AIOC consortium members have made significant direct investments in the development of the ACG field, with some AIOC member companies also investing in the construction of the Baku-Tbilisi-Ceyhan (BTC) pipeline. BP is the largest foreign investor and has been involved in Azerbaijan since 1992.

Much of Azerbaijan's oil is marketed by the Socar's Geneva-based subsidiary Socar Trading, which has been in operation since 2008. As the largest shareholder in ACG, BP is also a regular marketer of Azerbaijan's crude oil.

The industry is regulated by the Ministry of Industry and Energy, which was established in April 2001. The ministry formulates state energy policy and regulates SOCAR. In addition, it is tasked with attracting foreign investment, setting tariffs, and conducting negotiations on pipelines and production-sharing agreements.

Exploration and production

New projects, including the Chirag Oil Project, may boost Azerbaijan's production, as ACG failed to meet ambitious output expectations.

Oil production in Azerbaijan increased from 315,000 bbl/d in 2002 to 1.0 million bbl/d in 2010. However, production declined since then, falling to 932,000 bbl/d in 2012. Monthly data through July 2013 show that this year's production thus far has continued its decrease, falling to an average of 910,000 bbl/d for the first seven months of the year. EIA forecasts Azerbaijan's production will decline to about 850,000 bbl/d in 2014.

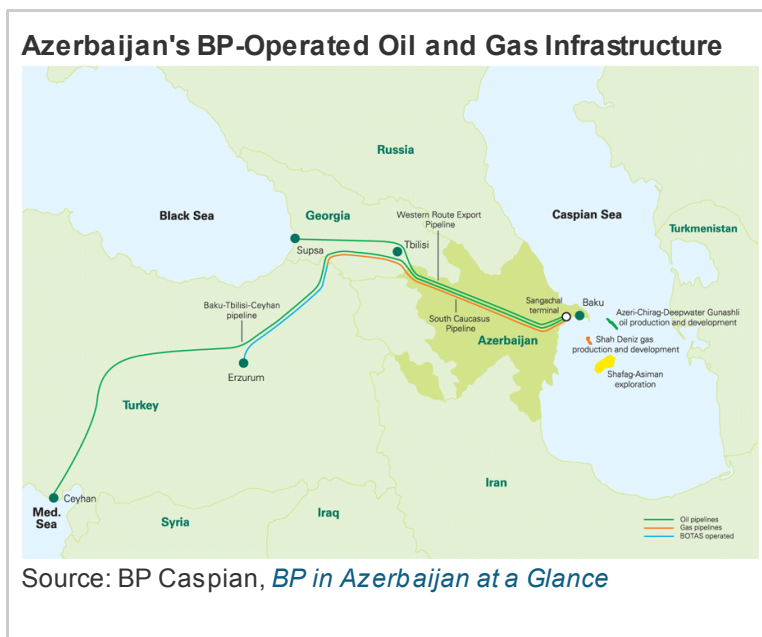
Azerbaijan's main producing field, the ACG field, covers 167 square miles and is located 62 miles east of Baku in the Caspian Sea. Peak production was expected to reach 1 million bbl/d, but production at this field so far failed to reach this target. Production problems have affected ACG output in the past couple years, with unexpected production declines occurring because of technical problems. A new development, the Chirag Oil Project (COP), plans to increase oil production and recovery from the ACG field through a new offshore facility. COP is expected to be commissioned in late 2013, according to BP, with peak production capacity reaching 360,000 bbl/d.

In addition to the ACG output, a small but stable volume of approximately 40,000 bbl/d of condensate is produced at the BP-operated Shah Deniz field, with further volumes produced by SOCAR, mainly from the shallow-water Guneshli field.

Azerbaijan produces three grades of crude oil, the SOCAR-produced barrels, Azeri BTC, and Azeri Light. The SOCAR-produced crude oil is mainly refined domestically, with only a small fraction available for exports as domestic demand has grown. However, the small volumes of this crude oil that are slated for exports are shipped via the northern export pipeline to Russia's Black Sea port of Novorossiysk. Due to its poor quality, the SOCAR-produced crude oil is blended in Russia and marketed as Urals blend.

The country's main export crude oil streams are Azeri BTC and Azeri Light. These two grades are fairly similar and are mainly sold to European and Asian markets. Azeri BTC blend, named for the Baku-Tbilisi-Ceyhan (BTC) pipeline through which it is exported, is made up of mostly Azeri Light from the ACG field as well as the Shah Deniz condensate, which has been blended into the crude stream since 2007. In addition, volumes of Turkmenistan's Cheleken crude are added to make up the blend. Azeri BTC is a medium-light, sweet blend (36.6° API gravity, 0.16 percent sulfur), and although its quality has varied over the past few years, it continues to be prized for its high middle-distillate yield. Once transported via the BTC pipeline, the crude oil is loaded onto tankers at the Turkish port Ceyhan on the Mediterranean Sea and shipped to markets across Europe.

Azeri Light is only from the BP-operated ACG field, and it is a medium-light, sweet crude oil (35° API gravity, 0.14 percent sulfur), very similar in quality to Nigeria's Bonny Light. Most Azeri Light volumes are shipped via the Western Route Export Pipeline, which runs between Sangachal oil terminal and Supsa. In addition, volumes of Azeri Light are transported from Sangachal to the Black Sea port of Batumi by rail.



Oil exports

Azerbaijan's oil industry was transformed with the construction of the BTC oil pipeline, unlocking the country's oil sector potential by providing an outlet for the crude oil. The country is mainly a crude oil and condensate exporter, but it also exports small volumes of petroleum products.

Azerbaijan exported an estimated 850,000 bbl/d of liquid fuels in 2012, falling by about 7 percent compared with 2011. Azerbaijan's exports peaked in 2010 when they averaged approximately 967,000 bbl/d, but concurrent with its production declines, exports have fallen every year since then.

Although mainly a crude oil and condensate exporter, according to Eastern Bloc Energy, Azerbaijan exports small volumes of refined petroleum products to its neighbors, including diesel, gasoline, and jet fuel, with the majority of the refined product exports destined for Russia and Georgia.

Although Azerbaijan has three export pipelines, most (about 80 percent) of its oil is exported via the BTC, with small amounts shipped by truck and railway. The country's oil industry was transformed with the construction of the BTC, which began operations in 2006. BTC allowed for exports of lighter and sweeter crude than Russia's Urals blend from the region, but it also provided transportation capacity out of the Caspian that was not reliant on the congested Turkish straits or Russia's territory.

The BTC pipeline system runs 1,100 miles from the Sangachal terminal near Baku, through Azerbaijan, Georgia, and Turkey, to the Mediterranean port of Ceyhan. From there the oil is shipped by tanker to global markets. The BP-operated pipeline began exporting in July 2006 and has a capacity of 1.0 million bbl/d. Most of the oil transported via the BTC is sourced at the ACG field, but volumes of the Shah Deniz condensate and the Cheleken crude from Turkmenistan also flow through the pipeline. The BTC pipeline is also used to export small volumes of Kazakh oil, which travels by tanker across the Caspian to the Sangachal Terminal, near Baku.

The Baku-Novorossiysk, or Northern Route Export Pipeline (NREP), is 830 miles long with a capacity of 100,000 bbl/d and has been operating since 1996. The pipeline runs from the Sangachal Terminal to Novorossiysk, Russia on the Black Sea. SOCAR operates the Azerbaijani section, and Transneft operates the Russian section, which has at times complicated the operation of the pipeline as there is an ongoing dispute between SOCAR and Transneft concerning transportation tariffs. There are proposals to increase the capacity on the pipeline to between 180,000 and 300,000 bbl/d, a key transportation addition as production grows in the Caspian in the future.

Recently, the Russian state-owned company Rosneft and SOCAR have been negotiating a potential reversal of Urals crude through the Baku-Novorossiysk pipeline, with plans to ship about 100,000 bbl/d through the pipeline. Final decision on the reversal is expected by the end of 2013.

Most of the Azeri Light volumes are transported via the Baku-Supsa pipeline (or Western Route Export Pipeline), which has an estimated capacity of 145,000 bbl/d and runs approximately 520 miles from Baku to Supsa, Georgia on the Black Sea. From there, the crude is shipped via tankers through the Turkish straits to European markets. AIOC owns and operates the pipeline on behalf of SOCAR. The pipeline has been operating since 1999.



Downstream

Azerbaijan has a crude oil refining capacity of 399,000 bbl/d as of January 2013, according to the OGJ. Azerbaijan's crude oil is refined domestically at two refineries: the Baku refinery, with a capacity of 239,000 bbl/d, and the New Baku refinery, with a capacity of 160,000 bbl/d.

Under a modernization project, new equipment is being installed at both refineries and at the specialized port of Dubendi. Both refineries also require modern pollution control equipment, which will be installed as part of the upgrading project. Work on the refineries is also intended to bring output of the processing units up to EU-quality standards.

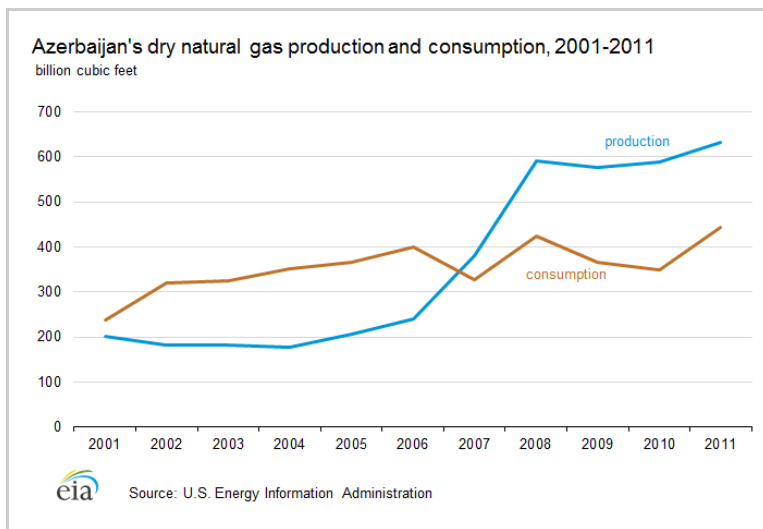
Natural gas

With the startup of the Shah Deniz natural gas and condensate field in late 2006, Azerbaijan became a natural gas net exporter.

According to the OGJ, Azerbaijan's proven natural gas reserves were roughly 35 trillion cubic feet (Tcf) as of January 2013. The vast majority of these reserves are associated with the Shah Deniz field. Recent discoveries of the Absheron and Umid formations, a further 15 Tcf of resources are estimated in place, according to Deutsche Bank.

Although historically an oil producer, Azerbaijan's importance as a gas producer and exporter is growing. Most of the natural gas production comes from the Shah Deniz field, although some volumes of natural gas are produced alongside oil in the ACG field.

Natural gas plays a central role domestically, and it likely will gain importance in the future, particularly in the electric power sector. Azerbaijan likely will see an increase in domestic consumption of natural gas as it continues to replace Soviet-era oil-fired power plants with new combined cycle natural gas turbines.



Sector organization

Azerigaz, a SOCAR subsidiary, is responsible for natural gas processing, transport, distribution, and storage, mainly in the domestic market. Azneft, another SOCAR subsidiary, is responsible for exploration, development, and production from the older onshore and offshore natural gas fields owned directly by SOCAR.

AIOC is the largest foreign joint venture in association with SOCAR. It is involved in the development of the ACG oil and gas fields and the Shah Deniz gas field. Statoil and BP operate the Shah Deniz gas field, and they are the largest shareholders in the Shah Deniz consortium, each holding 25.5 percent. Other shareholders include Total, LUKoil, SOCAR, Naftiran Intertrade Company (NICO), each at 10 percent, while Turkiye Petrolery A.O. (TPAO) holds 9 percent.

Exploration and production

The Shah Deniz field, discovered in 1999, is one of the world's largest natural gas and condensate fields. Shah Deniz Full Field Development is expected to have peak capacity of 565 Bcf (in addition to the 315 Bcf in Phase I), making it one of the largest gas development projects anywhere in the world.

In 2011, Azerbaijan produced 631 billion cubic feet (Bcf) of dry natural gas and consumed 444 Bcf. Almost all of Azerbaijan's natural gas is produced in two offshore fields, the ACG complex and Shah Deniz. The Shah Deniz natural gas and condensate field started producing in late 2006, making Azerbaijan a net gas exporter. The ACG field provides associated gas to the Azerigaz system for domestic use via an undersea gas pipeline to Sangachal Terminal at Baku. The Sangachal Terminal, located south of Baku, is one of the world's largest integrated oil and gas processing terminals. It receives, stores, and processes both crude oil and natural gas from the ACG fields and from Shah Deniz, then ships these hydrocarbons through the South Caucasus Pipeline (SCP) for export.

The Shah Deniz field, discovered in 1999, is one of the world's largest gas and condensate fields. According to BP, the operator of the development, it has approximately 40 Tcf of natural gas in place. It is located on the deep water shelf of the Caspian Sea, in water depths of up to 1,600 feet. In the first quarter of 2013, the field produced about 951 MMcf/d of natural gas and about 55,300 bbl/d of condensate.

Shah Deniz Phase I development includes a fixed offshore platform, two subsea pipelines to bring the hydrocarbons ashore, and a new onshore gas-processing terminal adjacent to the existing oil terminal at Sangachal, near Baku. According to BP, since the start of Shah Deniz production in late 2006 until the end of the first quarter 2013, about 1.4 Tcf of natural gas and 85 million barrels of Shah Deniz condensate were exported to world markets.

Shah Deniz Full Field Development (FFD) is expected to have peak capacity of 565 Bcf (in addition to the 315 Bcf in Phase I), making it one of the largest gas development projects anywhere in the world. It is expected to start producing in 2017 and supply European markets with natural gas sometime in 2019. The development of Shah Deniz FFD is currently in the front-end engineering and design (FEED) phase. Transportation of Shah Deniz gas from the Caspian Sea to Europe will require enhancement of the existing pipelines and development of new infrastructure.

Natural gas exports

The discovery and development of the Shah Deniz gas field along with the commissioning of the South Caucasus Pipeline (SCP) has transformed Azerbaijan's natural gas sector, allowing the country to become a net natural gas exporter.

Azerbaijan became a net exporter of natural gas in 2007; before that time it imported natural gas from Russia. In 2011, Azerbaijan exported an estimated 190 Bcf, mainly shipping it via the SCP. Volumes of natural gas are also exported to Russia via the Gazi-Magomed-Mozdok pipeline. A small volume of natural gas is shipped to Iran via the Baku-Astara pipeline. In exchange, Iran ships natural gas to Nakhchivan, Azerbaijan's exclave situated between Iran and Turkey. The exclave is wholly dependent on natural gas supplied by Iran.

Most of Azerbaijan's natural gas is destined for Turkey, but a small volume of its natural gas is supplied to Greece via the Turkey-Greece interconnector. Under a previous arrangement, Turkey was re-exporting Azerbaijani natural gas to Greece, but a new agreement allows Azerbaijan to directly export volumes to the European Union. The Shah Deniz FFD will result in increased exports to the European Union once the needed infrastructure is completed.

South Caucasus Pipeline (SCP)

The main conduit for Azerbaijan's natural gas exports is the SCP, also known as the Baku-Tbilisi-Erzurum (BTE) pipeline, which runs parallel to the BTC oil pipeline for 429 miles, before landing in Erzurum, Turkey. The 42-inch pipeline began exporting in 2007, and it has the capacity to transport about 300 Bcf of natural gas.

Gazi-Magomed-Mozdok Pipeline

This 150-mile pipeline transports natural gas from Azerbaijan to Russia under an agreement signed by SOCAR and Gazprom in 2009. Prior to 2007, this pipeline transported natural gas from Russia to Azerbaijan, but the agreement allowed the pipeline flow to be reversed, making Azerbaijan an exporter of natural gas to Russia. Gas exports to Russia began in 2010 at approximately 35 Bcf per year.

Baku-Astara Pipeline

As a result of tensions with Armenia, Azerbaijan began a swap deal with Iran that provides

natural gas to Azerbaijan's geographically separate Nakhchivan exclave in late 2006. Azerbaijan ships natural gas into Iran via the Baku-Astara Pipeline, and Iran then delivers the gas via the Salmas-Nakhchivan pipeline. Iran receives a 15-percent commission on transit fees.

Future pipeline projects

Since the Shah Deniz field was discovered, a number of pipeline projects have been proposed. While some, such as the Nabucco pipeline, were much talked-about but never realized, three projects proposed by the Shah Deniz consortium are believed to be viable options:

- Expansion of the **South Caucasus Pipeline**. A new parallel pipeline will be added to the existing line across Azerbaijan and Georgia, as well as two new compressor stations in Georgia. Once upgraded, the pipeline's capacity will increase to more than 700 Bcf. At the Georgia-Turkey border, the pipeline will link to TANAP and TAP (below).
- Construction of the **Trans Anatolian Natural Gas Pipeline** (TANAP), which will transport the Shah Deniz natural gas through Turkey. The 56-inch pipeline will run from the Georgia-Turkey border to the Turkey-Greece border.
- The **Trans Adriatic Pipeline** (TAP) will transport Azerbaijan's natural gas exports through Greece and Albania to Italy. BP announced in June 2013 that the Shah Deniz consortium selected TAP to deliver approximately 35 Bcf of natural gas to the European Union.

Electricity

Electricity consumption in Azerbaijan has grown considerably between 2000 and 2006, but it has fallen since then. Total electric power consumption may rise as the country's economy expands in the near future.

Azerbaijan's electricity consumption grew between 2000 and 2006, reaching a peak of 20 billion kilowatthours (kWh) in 2006. However, total electric power consumption decreased to 14 billion kWh in 2010. The growth in consumption occurred as electrification rates increased and the economy expanded.

Azerbaijan has total installed generating capacity of approximately 6 GW, but according to some sources, its actual generation capacity is closer to 5 GW because several of the country's largest power plants are old and operating below design capacity. The country's fossil fuel power plants account for around 86 percent of total power generation. The eight hydropower plants and a small amount of wind capacity account for the remainder of the country's installed generating capacity. A total of 13 fossil fuel power plants operate in Azerbaijan.

Azerenerji is Azerbaijan's state power utility, and it is responsible for generation, transmission, and distribution of electric power. Azerbaijan's electric power sector is in need of modernization, and there is a considerable effort underway to renovate and modernize the sector. This effort includes reconstruction of aging power plants and upgrading of the transmission grid. Plans are underway to convert fuel oil-fired power plants

to combined-cycle natural gas plants in order to free up more oil for export.

The Nakhichevan enclave is dependent on power imports from Iran, and Azerbaijan still suffers substantial line losses in the transmission of electricity from generation facilities to end-users.

There is no competition in Azerbaijan's power sector, as Azerenerji owns all of the country's power plants. Electricity prices are regulated, and power generators are required to supply their power to the central dispatch system for transmission and distribution.

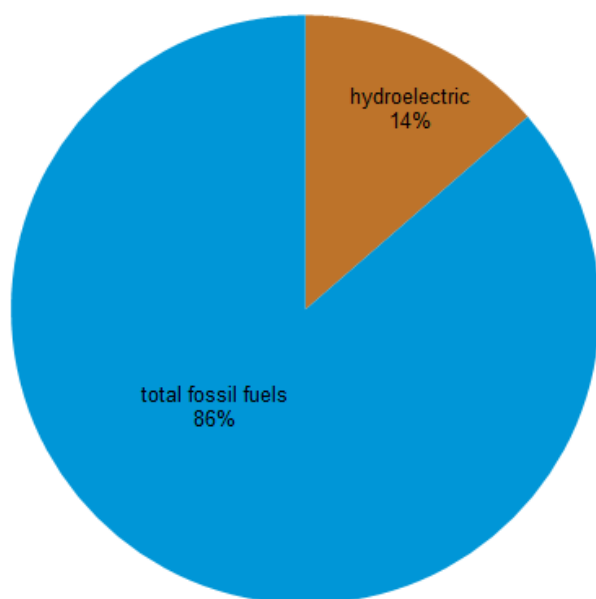
The power transmission system includes the national grid, 63 high-voltage substations, and more than 2,600 miles of power lines. Most of the substations located on the Absheron peninsula (which is where Baku and its metropolitan area are situated) have been operating for more than 60 years.

Azerbaijan's power plants

Plant	Installed capacity (MW)	Type
Ali Bayramli	1,050	Oil-fired, steam
Araz	22	Hydro
Astara	87	Gas-fired, turbine
Azerbaijan	2,400	Oil-fired, steam
Baku PP	105	Gas-fired, turbine
Baku TPC	106	Combined heat and power
Bilav	22	Hydro
Khachmaz	87	Gas-fired
Mingachevir	418	Hydro
Nakhchivan GTES	64	Gas-fired
Nakhchivan PP	87	Gas-fired
Sangachal	300	Multi-fuel
Shahdagh	105	Gas-fired
Shaki	87	Gas-fired
Shamkir	380	Hydro
Shimal	400	Gas-fired, combined cycle
Shirvan	900	Gas-fired, combined cycle
Sumgait	525	Gas-fired, combined cycle
Tartar	50	Hydro
Varvara	16	Hydro
Vaykhir	5	Hydro
Yenikend	150	Hydro
TOTAL	7,366	

Source: Azerenerji, IHS Global Insight

Azerbaijan's electricity net generation by type, 2011



Source: U.S. Energy Information Administration

Azerbaijan's electricity transmission and distribution network

Type	Number of lines	Length (miles)	Substations
550-kV	2	368	1
330-kV	13	750	6
220-kV	19	762	9
110-kV	119	932	47

Source: Azerenerji, IHS Global Insight

Notes

- Data presented in the text are the most recent available as of September 10, 2013.
- Data are EIA estimates unless otherwise noted.

Sources

- Azerenerji
- Bloomberg
- BP
- CIA World Factbook
- Deutsche Bank
- Eastern Bloc Research
- Energy Intelligence
- The Financial Times
- IHS Global Insight

- IHS EDIN
- International Energy Agency
- Oil and Gas Journal
- Reuters
- SOCAR
- PFC Energy
- Trend Daily Economic News
- Upstream Online
- U.S. Energy Information Administration